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Search Results -

Terms	Documents
L1 and (prolactin and intraductal)	4

Database: US Patents Full-Text Database; US Pre-Grant Publication Full-Text Database; JPO Abstracts Database; EPO Abstracts Database; Derwent World Patents Index; IBM Technical Disclosure Bulletins

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Search History

DATE: Friday, May 16, 2003 Printable Copy Create Case

Set Name side by side	Query	Hit Count	Set Name result set
DB=USPT; PLUR=YES; OP=OR			
L2	L1 and (prolactin and intraductal)	4	L2
L1	intraductal same (prolactin)	4	L1

END OF SEARCH HISTORY

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Search Results -

Terms	Documents
L6 and (dye or stain or oxytocin)	1

Database: US Patents Full-Text Database; US Pre-Grant Publication Full-Text Database; JPO Abstracts Database; EPO Abstracts Database; Derwent World Patents Index; IBM Technical Disclosure Bulletins

Search: Refine Search

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DATE: Friday, May 16, 2003 Printable Copy Create Case

Set Name side by side	Query	Hit Count	Set Name result set
DB=USPT; PLUR=YES; OP=OR			
L7	L6 and (dye or stain or oxytocin)	1	L7
L6	4708933.pn.	1	L6
L5	4703016.pn. and (oxytocin and stains)	1	L5
L4	470316.pn. and (oxytocin and stains)	0	L4
L3	6440445.pn. and (dye and stain and prolactin)	1	L3
L2	L1 and (prolactin and dye)	1	L2
L1	5248615.pn.	1	L1

END OF SEARCH HISTORY

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L1: Entry 1 of 4 File: USPT Jan 26, 1993

DOCUMENT-IDENTIFIER: US 5182302 A
**** See image for Certificate of Correction ****
TITLE: Method for enhancing growth of mammary parenchyma using a prostaglandin

Brief Summary Text (5):
Using rabbits, mice and rats that were physiologically abnormal, i.e., ovariectomized and/or pretreated (e.g. with a reproductive hormone) to induce pseudopregnancy, studies have been made of effects on mammary gland development by subcutaneous injection of a somatotropin and/or other hormones, implants that released cholera toxin, or intraductal injection of "lactogenic hormone". Lyons et al., 50 Proc. Soc. Exper. Biol. Med. 308-11 (1942) and 14 Recent Prog. Hormone Res. 219-54 (1958); Fiddler et al., 49 J. Endocrin. 459-69 (1971); Daniel et al., 224 Sci. 1245-47 (1984); and Silberstein et al., 81 Proc. Natl. Acad. Sci. USA 4950-54 (1984). Based on other studies using rabbits that were pregnant or pretreated (e.g. with a reproductive hormone) to induce pseudo-pregnancy, it has been reported that intraductal injection of prolactin or "lactogenic hormone" induced lactation. Bradley et al., 14 J. Endocrin. 28-36 (1956) and Meites et al., 150 Amer. J. Physiol. 394-99 (1947). Others have studied in vitro effects of mitrogens such as an epidermal growth factor, with or without insulin, on the growth of cultured mammary cells of various animal species. Imagawa et al., 79 Proc. Natl. Acad. Sci. USA 4074-77 (1982); Taketani et al., 113(3) Endocrin. 871 (1983) and 80 Proc. Natl. Acad. Sci. USA 2647-50 (1983); Tonelli et al., 285 Nature 250-52 (1980); and Turkington, 57 Exper. Cell Res. 79-85 (1969). The disclosures cited in this paragraph are incorporated here by reference.

End of Result Set

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L1: Entry 4 of 4 File: USPT Oct 22, 1991

DOCUMENT-IDENTIFIER: US 5059586 A
TITLE: Method for enhancing growth of mammary parenchyma

Brief Summary Text (5):
Using rabbits, mice and rats that were physiologically abnormal, i.e., ovariectomized and/or pretreated (e.g. with a reproductive hormone) to induce pseudopregnancy, studies have been made of effects on mammary gland development by subcutaneous injection of a somatotropin and/or other hormones, implants that released cholera toxin, or intraductal injection of "lactogenic hormone". Lyons et al, 50 Proc. Soc. Exper. Biol. Med. 308-11 (1942) and 14 Recent Prog. Hormone Res. 219-54 (1958); Fiddler et al, 49 J. Endocrin. 459-69 (1971); Daniel et al, 224 Sci. 1245-47 (1984); and Silberstein et al, 81 Proc. Natl. Acad. Sci. U.S.A. 4950-54 (1984). Based on other studies using rabbits that were pregnant or pretreated (e.g. with a reproductive hormone) to induce pseudo-pregnancy, it has been reported that intraductal injection of prolactin or "lactogenic hormone" induced lactation. Bradley et al, 14 J. Endocrin. 28-36 (1956) and Meites et al, 150 Amer. J. Physiol. 394-99 (1947). Others have studied in vitro effects of mitogens such as an epidermal growth factor, with or without insulin, on the growth of cultured mammary cells of various animal species. Imagawa et al, 79 Proc. Natl. Acad. Sci. U.S.A. 4074-77 (1982); Taketani et al, 113(3) Endocrin. 871 (1983) and 80 Proc. Natl. Acad. Sci. U.S.A. 2647-50 (1983); Tonelli et al, 285 Nature 250-52 (1980); and Turkington, 57 Exper. Cell Res. 79-85 (1969). The disclosures cited in this paragraph are incorporated here by reference.

Other Reference Publication (18):
Fiddler et al., "Effects of Intraductal Prolactin on Some Aspects of the Ultrastructure and Biochemistry of Mammary Tissue in the Pseudopregnant Rabbit", 49 J. Endocrin. 459-69 (1971).

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L1: Entry 26 of 31 File: USPT Sep 28, 1993

DOCUMENT-IDENTIFIER: US 5248615 A
TITLE: Calibrator composition for prolactin assay

Detailed Description Text (16):
The term "label" refers to any substance which is attached to a specific binding member and which is capable of producing a signal that is detectable by visual or instrumental means. Various suitable labels with which the prolactin solutions of the present invention can be used include chromogens; catalysts; fluorescent compounds; chemiluminescent compounds; radioactive labels, direct visual labels including colloidal metallic and non-metallic particles, dye particles, enzymes or substrates, or organic polymer latex particles; liposomes or other vesicles containing signal producing substances; and the like.

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L1: Entry 2 of 4 File: USPT Jul 14, 1992

DOCUMENT-IDENTIFIER: US 5130300 A
TITLE: Method for enhancing growth of mammary parenchyma

Brief Summary Text (5):
Using rabbits, mice and rats that were physiologically abnormal, i.e., ovariectomized and/or pretreated (e.g. with a reproductive hormone) to induce pseudopregnancy, studies have been made of effects on mammary gland development by subcutaneous injection of a somatotropin and/or other hormones, implants that released cholera toxin, or intraductal injection of "lactogenic hormone". Lyons et al, 50 Proc. Soc. Exper. Biol. Med. 308-11 (1942) and 14 Recent Prog. Hormone Res. 219-54 (1958); Fiddler et al, 49 J. Endocrin. 459-69 (1971); Daniel et al, 224 Sci. 1245-47 (1984); and Silberstein et al, 81 Proc. Natl. Acad. Sci. USA 4950-54 (1984). Based on other studies using rabbits that were pregnant or pretreated (e.g. with a reproductive hormone) to induce pseudopregnancy, it has been reported that intraductal injection of prolactin or "lactogenic hormone" induced lactation. Bradley et al, 14 J. Endocrin. 28-36 (1956) and Meites et al, 150 Amer. J. Physiol. 394-99 (1947). Others have studied in vitro effects of mitogens such as an epidermal growth factor, with or without insulin, on the growth of culture mammary cells of various animal species. Imagawa et al, 79 Proc. Natl. Acad. Sci. USA 4074-77 (1982); Taketani et al, 113 (3) Endocrin. 871 (1983) and 80 Proc. Natl. Acad. Sci. USA 2647-50 (1983); Tonelli et al, 285 Nature 250-52 (1980); and Turkington, 57 Exper. Cell Res. 79-85 (1969). The disclosures cited in this paragraph are incorporated here by reference.

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L2: Entry 1 of 10 File: USPT Nov 20, 2001

DOCUMENT-IDENTIFIER: US 6319510 B1
TITLE: Gum pad for delivery of medication to mucosal tissues

Abstract Text (1):
The Gum Pad is a laminate composed of: (a) a synthetic base or backing layer which is configured to be held in place on the gingiva (gums) in the mouth; (b) an intermediate, reservoir layer for containing medication therein; and (c) a semi-permeable outer layer facing outwardly toward oral mucosal tissues in the mouth which will allow saliva to enter and dissolve the medication in the reservoir layer into solution and pass the diffused saliva-medication solution outwardly to the oral mucosal tissues. The backing layer is placed on the gum so that the semi-permeable outer layer faces outwardly toward the buccal mucosa. Saliva enters the semi-permeable layer and dissolves the medication in the reservoir layer, then diffuses outwardly through the semi-permeable layer to the mucosal tissues in the mouth where it is readily absorbed into the circulatory system. The Gum Pad can be used for the topical or systemic delivery of a wide range of pharmaceutical and nutritional agents, for the treatment of a variety of human disorders and diseases.

Brief Summary Text (2):
This invention relates generally to an improved methods for treatment of systemic diseases and illnesses by delivery of medication into the body through oral mucosal tissue. More particularly, it concerns the use of a layered pad (Gum Pad) which is worn intra-orally on the gums for dispensing medication contained in the pad by saliva diffusion and transport to the oral mucosal tissues.

Brief Summary Text (11):
Oral transmucosal delivery forms and devices are known to the art. U.S. Pat. No. 3,510,053, to Focke, U.S. Pat. No. 5,197,882 to Jemberg, U.S. Pat. No. 5,267,862 to Parker and U.S. Pat. No. 5,326,685 to Gaglio et al. are illustrative of such prior art. The Gaglio patent is of interest as it discloses an oral pad device having a hollow pocket formed by a flexible backing material and a porous outer layer for holding a viscous medication in gel, salve or liquid form. The viscous medication can pass through the porous layer onto the surfaces desired to be treated, such as the gums for treatment of gum diseases or onto the teeth for teeth whitening. The rate of delivery depends entirely on the porosity of the flexible outer layer.

Brief Summary Text (24):
In a preferred embodiment of the oral transmucosal device (referred to herein as the "Gum Pad"), the ends of the pad are bulb shaped and contain relatively more medication than the narrower mid-portion. The layers are heat sealed to form a pocket around the reservoir layer. The pad is inserted between the gums and buccal mucosa with the shape of the pad conforming to the curvature of the mandible or maxilla. The mid-portion of the pad rests on the front portion of the gums and the ends of the pad rest on the gums toward the sides and back of the mouth, in front of the temporo-mandibular joint. The preferred position is for the base layer of the pad to rest on the gums so that the semi-permeable membrane is facing outwardly in contact with the buccal mucosa. The pad can be placed over one or both the upper and lower jaws, according to the parameters for delivery of medication and/or patient preference. The pad is comfortable and does not interfere with speech. A light adhesive may be applied to the base layer for more secure mounting on the gums, particularly if the delivery parameters require wearing the pad over a longer period of time. The pad can be removed by the patient once the desired clinical effects are achieved.

Brief Summary Text (25):
The reservoir layer can contain dried or freeze-dried medication together with exipient or hydrogel matrix. A variety of adjuvants may be combined in the reservoir

layer to enhance absorption, such as surfactants, bile salts, chelating agents, and cyclodextrins, among others. When the pad comes in contact with saliva, the medication is reconstituted and diffuses out of the device and over a sizeable area of the mucosa (mucous membranes of the mouth). Examples of medication that are suitable for delivery through the oral mucosa include: (1) anticonvulsants; (2) anxiolytics; (3) anesthetics; (4) analgesics; (5) proteins and peptides; (6) antiemetics; and (7) beta-adrenergic blockers. The Gum Pad may also be used for the topical or systemic delivery of nutritional products such as vitamins, minerals, herbs, and food supplements

Detailed Description Text (2):
Turning now descriptively to the drawings, in which similar reference characters denote similar elements throughout the several views, and to FIG. 6 in particular, an oral transmucosal device in accordance with the present invention ("Gum Pad") 10 comprises a nonporous backing layer 12, an intermediate reservoir layer 14 containing medication 16 therein, and a semi-permeable outer layer 18 covering the reservoir layer. The semi-permeable outer layer 18 is sealed to the backing layer 12 along seal line 20, thus forming a closed envelope around the reservoir layer 14. The medication 16 in the reservoir layer 14 may be topical or systemic, consisting suitably of biologically active pharmaceutical or nutritional agents 21 that are dried or freeze-dried.

Detailed Description Text (3):
For use as shown particularly in FIG. 7, the nonporous backing layer 12 is applied high up or low down against the gum tissue 26 of the teeth 28 in the mouth of a person 24, with the semi-permeable outer layer 18 facing the buccal mucosa 22. Saliva in the mouth of the person 24 will penetrate through the semi-permeable layer 18 and cause the dried or freeze-dried active agent 21 in the reservoir layer 14 to liquefy and diffuse through the semi-permeable layer 18. The nonporous backing layer 12 contributes stability, but allows flexibility, so that the pad can adapt to the mucosal cavity without buckling or curling.

Detailed Description Text (5):
The Gum Pad 10, as best seen in FIGS. 4 and 5, has an elongated generally tubular shaped body 38 with bulb shaped ends 40, to supply a large posterior area of the gum tissue 26 and additionally to stabilize placement between the buccal mucosa 22 and the gum tissue 26 of the teeth 28. The nonporous backing layer 12 is flat, while the semi-permeable outer layer 18 is curved on the tubular shaped body 38, so as to fit snugly and comfortably between the buccal mucosa 22 and the gum tissue 26 in the mouth of the person 24.

Detailed Description Text (6):
The Gum Pad 10 is designed to deliver any of a variety of pharmaceutical and nutritional agents, herein referred to generally as medication. Medication 16 is delivered topically or systemically as it diffuses away from the pad 10 toward the mucosa 22 of the cheek, the floor of the mouth, the palate, and the upper pharynx. When topically applied, the medication is used to directly affect the mucosa to treat, protect or enhance the growth of the surrounding gum tissue 26. When systemically applied, the medication 16 travels through the mucosa 22 and into the systemic circulation where it can affect various body systems.

Detailed Description Text (7):
Structure of the Gum Pad: Backing Layer

Detailed Description Text (9):
The backing material rests against the gum and forms a barrier that prevents migration of the medication onto the less absorptive surface of the gum. The backing layer material is selected to be rigid enough to prevent buckling, soft enough to be comfortable, and flexible enough to conform to the pocket formed by the gum and buccal mucosa. The backing layer maintains the structural integrity of the Gum Pad and acts to protect against excessive swelling in the drug-impregnated reservoir layer. The backing layer may be a thermoplastic film or non-woven layer of synthetic fibers or a combination of synthetic and natural fibers. The basis weight can range from about 20 gsy to about 120 gsy, preferably from 30 gsy to 90 gsy. The thickness of the backing layer can range from about 0.030 cm to 0.30 cm.

Detailed Description Text (11):
Due to its unique shape, the Gum Pad can remain snugly in place between the gingiva and buccal mucosa without use of adhesive. However, there are circumstances that support the use of adhesive as when the patient is unable to fully cooperate and may intentionally or unintentionally dislodge the pad. If indicated, an adhesive compound, such as chitosan, can be applied to the external surface of the synthetic backing layer and pressed firmly against the gum for use. An alternative approach is for the base layer to be formed from a hydrophilic polymeric resin that would naturally adhere to the gum tissue. Any adhesive can cause mucosal irritation, although irritation is less likely with an adhesive such as chitosan. Other problems associated with adhesive use are bad taste, unpleasant textural sensation, and difficulty in affixing or removing the patch.

Detailed Description Text (12):
Structure of the Gum Pad: Reservoir Layer & Medication

Detailed Description Text (25):
Hydrogel matrix is well-suited for use with medications because it can be designed to provide controlled release of various concentrations of medication over various intervals ranging from 30 minutes to more than 8 hours. Hydrogel matrix can contain almost any biologically active medication, including proteins and peptides. The matrix is a three dimensional polymeric network that is partially water soluble. It is non-toxic and does not dissolve in body fluids such as saliva or undergo any significant degredation over the expected Gum Pad application time of up to 8 hours. Approximately 20 wt % to 85 wt % of the hydrogel matrix is comprised of hydrophilic polymer, polymeric networks that retain more than 20% of volume in water. The polymer can more than double in size as it absorbs saliva. The Gum Pad's semi-permeable membrane releases solution and limits the expansion of the polymer, preventing the accumulation of excessive bulk that could cause patient discomfort.

Detailed Description Text (30):
When the medication is dispersed in a hydrogel matrix, it is delivered in the following manner. The saliva flows through the semi-permeable membrane into the hydrogel matrix producing a solution with the medication. The hydrophilic polymer expands as it absorbs fluid (saliva) into the matrix. Through expansion, the polymer exerts pressure on the solution or suspension and this causes the medication to flow out into the fluid environment. Small molecules diffuse directly through the hydrogel matrix while larger molecules exit through pores and channels into the fluid environment, as noted in Rhine, et al., Journal of Pharmaceutical Sciences, Vol. 69, 265-270 (1980). The freeze-dried hydrogels of the disclosure demonstrate a pore size of about 8-10 um, contributing to a rapid rate of swelling and a correspondingly rapid rate of medication outflux. The rate is also controlled by the osmotic pressure gradient across the wall and the size of the medication molecule. These factors can be controlled by selection of medication and its concentration and by altering the physical properties of the polymer through the selection of materials (chitosan, polyvinyl, etc.) and the application of cross-linking agents. Hydrogel matrix is formed to fit in the reservoir layer of the Gum Pad. The hydrogel matrix allows diffusion of fluid (saliva) into a polymeric matrix containing dispersed biologically active molecules, with subsequent mixing and dissolving of the active agent. Composition and use of hydrogels to contain and deliver medication are described in U.S. Pat. No. 4,642,903 to Davies, and U.S. Pat. No. 5,114,719 to Sabel, et al. Medication delivery is enhanced if the polymer used for the hydrogel takes up water continuously. This causes more of the medication to mix with the fluid and flow out of the device. The continuous water uptake polymer disclosed in U.S. Pat. No. 5,320,840 of Camble et al., would be suitable for use in the Gum Pad when very rapid medication delivery is desired. One skilled in the art can select polymeric ingredients and cross linking agents that, when suitably combined in the proper measure, will insure a hydrogel matrix with the preferred combination of properties.

Detailed Description Text (34):
Meltback is an additional problem that occurs when the heat required during the drying process melts the frozen material. Meltback defeats the purpose of freeze-drying, the removal of water through sublimation rather than evaporation. Meltback would be unlikely during Gum Pad preparation because of the small size and limited thickness of

the device.

Detailed Description Text (36):
Structure of the Gum Pad: Semi-Permeable Outer Layer

Detailed Description Text (37):
The semi-permeable membrane is formed from polymers known to the art as osmosis and reverse osmosis membranes. The membrane employed in the Gum Pad is a soft, non-irritating fibrous or foam layer that allows the influx and outflux of biological fluids such as saliva. The membrane is insoluble in saliva and, in addition, does not react with the medication or any additives contained in the freeze-dried preparation. The membrane is strong enough to remain intact while resisting the pressure of hydrogel expansion.

Detailed Description Text (39):
The semi-permeable membrane is comprised of a flexible, high flux semi-permeable material. Such materials include: a thin polymer film containing pores; a mat of non-woven, thermally fused fibers with apertures formed by inter-fiber spaces; and a foam layer with open cells as pores. High flux membranes promote the rapid delivery of medication. When the medication contained in the Gum Pad is a small molecule that is highly soluble in saliva and amorphously dispersed with an excipient, delivery can be accomplished in under 3 hours and in as brief an interval as 20 minutes. Thus a large dose of medication (e.g., 200 to 500 mg) can be administered over a relatively short period of time. When the medication is contained in hydrogel, the composition of the hydrogel determines the rate of delivery with the semi-permeable membrane exerting an additive rate limiting effect. Generally, suitable high flux semi-permeable membrane materials can have a thickness of about 1 to 10 mils; a porosity of about 30 to 70 vol. %; and a fluid permeability greater than about 2.times.10-4 cm mil/atm hr, expressed per atmosphere of hydrostatic or osmotic pressure difference across the membrane. High flux semi-permeable membranes indirectly shorten the medication delivery period by enhancing the flow of fluid across the membrane.

Detailed Description Text (40):
High flux semi-permeable membranes used to coat sustained-release tablets have been problematic in that they can fracture if bitten or chewed. Due to its extended length and installed position between the gum and mucosal tissues, the flexible membrane used in the Gum Pad is not susceptible to being fractured. In addition, the Gum Pad fits securely between the gum and buccal mucosa and is unlikely to be bitten or chewed.

Detailed Description Text (41):
Gum Pad Lamination and Wrapping Process

Detailed Description Text (42):
The matrix containing medication is placed in the reservoir space between the backing layer and the semi-permeable membrane. The edges of the backing layer and the semi-permeable membrane are laminated together to enclose the reservoir layer thus forming the Gum Pad. Chemical, thermal, or mechanical means, or any combination thereof, can be used to seal the pad. The pad can be simultaneously cut and heat-sealed using a conventional cutter/sealer. The sealing of plastics is known to the art and forms no portion of the novelty of this invention.

Detailed Description Text (43):
The Gum Pad may be laminated in continuous strip form, then cut into individual strips. To prevent premature reconstitution of the medication by exposure to moisture, the Gum Pad is wrapped in an individual, sealed envelope composed of a waterproof material, such as non-water soluble cellulose or cellulose derivative film. Impermeable polymer or aluminum envelopes may be used for humidity sensitive proteins. The envelope maintains sterility, increases shelf life, protects the Gum Pad from moisture, and promot used, the pad may be moistened prior to insertion for more rapid delivery of the medication.

Detailed Description Text (44):
The Gum Pad can be inexpensively manufactured as a simple laminate of a sheet of thermoplastic film for the base layer, an inner nonwoven reservoir layer impregnated with medication, and an apertured film as the semi-permeable layer, wherein the

peripheral outer edges of the base and semi-permeable layers are heat sealed or ultrasonically welded together. From such stock materials, a typical gum pad can be produced in strip form at a cost in the range of about $500-$1,000 per 2500 units, or about 20 to 40 cents per unit (excluding the cost of the drug agent), or substantially lower in larger quantities.

Detailed Description Text (45):
The Gum Pad is believed to have large commercial potential as a non-invasive, self-applied, slow-release delivery device for pharmaceuticals to treat a wide range of illnesses and organic conditions, such as treating periodontal diseases, preventing gum deterioration, treating bacterial or viral infection, regulating cardiovascular functions, preventing heart attacks and strokes, suppressing appetite, relieving pain, moderating digestive illnesses, stimulating immune system response, and moderating other metabolic and organic conditions.

Detailed Description Text (46):
Use of the Gum Pad

Detailed Description Text (47):
When the Gum Pad is placed between the gingiva and buccal mucosa the semi-permeable layer 18 comes in contact with saliva. Saliva penetrates through the apertures or pores in the semi-permeable layer 18 and enters the medication-retaining reservoir layer 14. The penetrating saliva combines with and dissolves the medication, shown as dry particles 21 in FIG. 6 when contained in an exipient matrix. When the medication is dispersed in a hydrogel matrix, the hydrophilic polymer expands as it absorbs saliva Through expansion, the polymer exerts pressure on the solution or suspension. In both instances, the medication diffuses in the saliva and is transported outwardly through the apertures or pores of the semi-permeable layer 18 to be absorbed by the mucosal tissue, as illustrated in FIG. 8. Upon absorption into the mucosal tissue, the medication enters the capillaries 22a and is transported within the circulatory system.

Detailed Description Text (48):
The Gum Pad is unique in its structure for mounting on the gums and saliva-activated diffusion toward the large surface areas of the buccal mucosa. The Gum Pad can deliver significantly more medication than other devices due to the capacity of the reservoir, the large mucosal surface to which the medication diffuses, and the length of time the device can be left in place. The pad is easy to insert, fits snugly, and is comfortable to wear. It remains in the gum/buccal pocket with or without adhesive. The pad can remain in place for hours if necessary, thus allowing for continuous delivery of medication. The pad can also be applied sequentially for continuous drug delivery. Dosage can be adjusted by changing the colloidal state of the medication in the reservoir layer. The time interval over which the medication is delivered can be extended or abbreviated by changing the porosity of the matrix in the reservoir layer and/or the permeability of the semi-permeable membrane.

Detailed Description Text (49):
The Gum Pad presents a number of advantages over other transmucosal delivery devices.

Detailed Description Text (50):
Buccal lozenges have been tested previously but found to be easily dislodged by mouth movements. Bioadhesive patches or sacks that attach directly to the buccal mucosa tend to deliver less medication because the agent is applied to only a small surface area. The Gum Pad with its extended tubular shape and bulbous ends, covers approximately 10 times more surface area than the adhesive patch and, on that basis alone, can deliver 10 times the amount of medication. If necessary, two pads can be applied simultaneously, one over the upper jaw and the other over the lower jaw. Such a system that would deliver 20 times more medication than the patch. In addition, the shape and placement of the pad allows it to be supported by the natural contours of the jaw, thereby allowing the use of adhesives to be avoided altogether. By placement on the gum facing outwardly toward the mucosal, the medication diffused and transported by saliva pressure can disperse over a larger mucosal surface area, thereby further increasing medication delivery, while also decreasing the likelihood of irritation since the mucosa is exposed to lesser concentrations of medication.

Detailed Description Text (51):
Treatment with the Gum Pad using approved medications for known illnesses should not ordinarily require close medical supervision, and presents no risk of scar formation or infection. The pad can be swiftly removed by the patient if adverse medication effects are noted. The pad is especially useful in situations where patients are active and require a convenient self-applied delivery device. Patients are expected to prefer the pad over injections, so the compliance rate should be excellent. Gum Pad delivery is particularly suitable for: pre-operative patients who must have an empty stomach; cancer patients who are nauseated; patients who fear needles; patients with skin conditions; and children who resist swallowing or who are afraid of injections.

Detailed Description Text (52):
The Gum Pad can be used in the near term for delivering topical or systemic medications that have already proven suitable for this type of administration, for example opioid agonists, opioid antagonists, antidepressants, anxiolytics, antibiotics, antifingals, nicotine, antihistamines, antihypertensives, beta-blockers, anaesthetics, cardiovascular and vascular, renal, heparin, antisiezure, hormones, antigens, antibodies, enzymes and other central nervous system-acting drugs such as levodopa. Nutritional supplements such as vitamins or minerals, herbs, and plant extracts have been delivered transmucosally and are also suitable for Gum Pad delivery.

Detailed Description Text (54):
Various medications and forms of medications can be delivered in an improved manner by the Gum Pad. For example, the Gum Pad can be used for medications as uncharged molecules, molecular complexes, pharmacologically acceptable salts such as hydrochlorides, hydrobromides, sulfate, laurylate, palmitate, phosphate, nitrite, borate, acetate, maleate, tartrate, oleate, and salicylate. For acid drugs, salts of metals, amines or organic cations, for example, quaternary ammonium can be used. Derivatives of drugs such as esters, amides, and ethers can also be used. Medications that are water insoluble can be delivered by use of a water soluble derivative that will serve as a solute. When the derivative is released systemically, it is converted by enzymes, hydrolyzed by body pH or other metabolic processes to the original biologically active form. Fat soluble substances can be absorbed by liposomes prior to incorporation in the pad.

Detailed Description Text (55):
A preferred residence time for effective drug delivery depends on the characteristics of the particular drug, but is at least 20-30 minutes. The kinetics of drug release depend on the characteristics of the matrix and relative percentages of its components, the total amount of medication incorporated, the particular application site, and the mode of application (topical or systemic). The total dose of the medication contained in the Gum Pad will vary according to the use of adjuvants and the pharmacodynamics of mucosal delivery and may be more or less than the standard oral, intramuscular, or intravenous dose. Speed of delivery can also be regulated by use of freeze-dried versus dried medication and by pre-insertion moistening. In general, delivery speed is: (1) slowest when the medication is dried and must be reconstituted by the saliva; (2) intermediate when the medication is dried but moistened prior to insertion; and (3) fastest when the medication is freeze-dried.

Detailed Description Text (56):
The Gum Pad may be used to deliver medication incorporated in liposomes when there is a particular need for the delivery of high concentrations over a prolonged interval (up to 24 hours) or, in the case of extremely fragile proteins and peptides, when extra preservation and protection is necessary.

Detailed Description Text (57):
The Gum Pad is well suited for delivery of biologically active polypeptides and proteins provided those peptides, or saliva activated peptides, are readily absorbed through the mucosa. The pad is usefull in the treatment of time-limited conditions such as seizures and cardiac arrhythmias where a rapid response with subsequent withdrawal of medication is essential. The pad is also advantageous when there is marked variability between patients in how much medication is necessary to achieve a desired effect (e.g. beta blockers). When the desired effect is noted, the physician or the patient can simply remove the pad. Medications that are insoluble or that have

a disagreeable taste can be contained within the hydrogel matrix. Some examples of specific systemic applications are further described below.

Detailed Description Text (58):
The Gum Pad can be and is intended to be used with a broad range of medications for the benefit of patients. Controlled laboratory and clinical trials using Gum Pad delivery are necessary to determine the safe and effective use of individual medications.

Detailed Description Text (59):
Pharmaceutical agents such as drugs, hormones and nutritional supplements including herbs, plant extracts and vitamins can be delivered using the Gum Pad. Classes of medication suitable for Gum Pad delivery include cardiovascular agents such as nitrates, antianrthymic, vasopressor, betaadrenergic blocking agents, vasodilators, and antihypertensive agents. Also deemed suitable are antibiotics, bacteriocidins, antiinflammatory, bronchodilator, antihistamine, antiemetic, muscle relaxant, and antiobesity agents. Agents that target the central nervous system (CNS) can be employed with the Gum Pad. These encompass stimulants, including respiratory stimulants, sedative hypnotics, anticonvulsants, analgesics, opioid agonists, opioid antagonists, antimigraine, antiemetic/antivertigo, antianxiety, antidepressant, antipsychotic, antiparkinson agents and agents to counteract or treat movement disorders.

Detailed Description Text (60):
The Gum Pad can be used to deliver pharmaceutically active forms of various proteins and peptides, including but not limited to gonadal and adrenal hormones such as estrogens, progestins, pregnenolone, DHEA, testosterones, corticosteroids, and aldosterone. It can be used to deliver centrally active neurohormones, neuroprotectants, and neurotransmitters as well as agents that affect neurotransmitters, their receptors, and their transporters, including agonists and antagonists of GABA, serotonin, norepinephrine, epinephrine, dopamine, excitatory amino acids, acetylcholine, and glycine. Other suitable medications include centrally active proteins and peptides such as beta-endorphin, enkephalins, bradykinin, angiotensin, gonadotropic hormones, thyroid stimulating hormone, adrenocorticotropic hormone, corticotropin releasing hormone, calcitonin, parathyroid hormone, growth hormone, and alpha or beta interferon. The Gum Pad can also be used to deliver neuromodulators such as Substance P, CCK, carnosine, cardiolipin, dynorphin, gastrin, glucagon, lipotropin, LHRH, neuropeptide Y, neurotensin, oxytocin, prolactin, secretin, somatostatin, and VIP. It can also be used to deliver adenosine derivatives, enzymes, enzyme inhibitors, ligands, genes, nucleotides, cytokines, phosphorarnidities, antigens, antibodies, antibodies against enzymes and proteins, signal transduction peptides, isotope labeled compounds and other biomarkers, myogenic regulatory factors, prostaglandins, growth factors such as troponin, osteoprotegerin, angiogenesis growth factors, NGF, VGEP, bFGF, EGF, PDGF, and agents that affect growth factor receptors.

Detailed Description Text (61):
The Gum Pad can also be used to deliver medication topically by reversing its position and placing the semi-permeable membrane against the tissue to be treated topically. Topical medications deemed suitable for use in this manner include local anesthetic, antiinflamatory, anticlotting, and antiinfection agents. Antiplaque agents, enzyme inhibitors, genetically engineered cells, and bioprotective agents such as cathepsin C and histatin. may be applied to promote gum health. A variety of analgesic agents can also be used in the pad. Medications that have the potential of preventing and treating periodontal disease can be used with the Gum Pad. These include gum growth promoting agents such as diphenylantoin sodium, cyclosporin, nifedipine, amlodipine, triclosan, cytokines, prostaglandins, retin-A or retinols, nerve growth factor, recombinant gene products, or bone growth proteins that stimulate the repair of bone and tooth anchoring connective tissue.

Detailed Description Text (62):
Nutraceutical agents can also be applied by the Gum Pad, including, but not limited to, folic acid, B-6, K-1, Co-Q, green tea, echinacea, myrrh or other medicinal oils, and derivatives of seaweed or kelp. The Gum Pad may be used for topical or systemic delivery of nutritional supplements or combinations of supplements that, for example,

may include vitamins, minerals, trace minerals, amino acids, antioxidants, alpha lipoic acid, CoQ10, DMAE, SAMe, phospholipids, choline, triglycerides, and hormones such as pregnenolone, DHEA, melatonin, naturally derived estrogen and progesterone. Plants or plant components can also be delivered by Gum Pad, including those from garlic, ginkgo biloba, kava kava, noni, ginseng, saw palmetto, milk thistle, stinging nettle, eucalyptus, aloe vera, feverfew, nasturtium, Ma Huang, and echinacea.

Detailed Description Text (64):
Several examples of specific medications that can be used in an improved mode of treatment with the Gum Pad are presented in the following examples. These examples do not imply nor should be inferred to imply that the use of the Gum Pad is limited to these particular medications.

Detailed Description Text (65):
1. Vigabatrin is an irreversible inhibitor of GABA-aminotransferase. It is effective in patients with refractory seizures and can be used when a patient has continued to seize in spite of treatment with other agents. The total amount of vigabatrin administered is in the range of 1.5-3 grams/day but a single seizure can often be aborted by the use of less than 0.5 grams. Vigabatrin is freely soluble in water and as such can be applied in an essentially aqueous solution to the Gum Pad. The absorbent second layer of the pad is impregnated with a solution containing 0.5 grams vigabatrin and then freeze-dried. The freeze-dried rapidly dissolves once the pad comes in contact with saliva. Vigabatrin is rapidly absorbed through the mucosa and the peak concentration in the plasma is reached within 20 minutes. Once a therapeutic level is attained, it remains at a significant concentration for about 5 days. To treat a refractory seizure, one or two Gum Pads containing Vigabatrin are placed between the gum and buccal tissues for a period of 5-20 minutes or until the seizure is aborted. The amount of Vigabatrin added to the absorbent layer can be varied along with the time interval that the pads are in contact with the buccal mucosa. Other anticonvulsant medications that could be considered for transmucosal administration are hydantoins, benzodiazapines, GABA analogues, succinamides, and carbamepazine.

Detailed Description Text (66):
Vigabatrin in doses of 0.25-0.50 grams effectively curbs the craving for nicotine and cocaine. Vigabatrin impregnated Gum Pads would afford more rapid relief of craving than the oral ingestion of vigabatrin. Nicotine delivered by gum, patch, or spray has been used to curb craving for cigarettes; nicotine could also be delivered by the Gum Pad.

Detailed Description Text (67):
2. The anxiolytic, aprazolam, is a short acting benzodiazapine that acts through binding with GABA receptors in the brain. Lipid solubility facilitates the rapid passage of the medication into the brain. A relatively short duration of action makes aprazolam suitable for the treatment of brief discomforts occasioned by anxiety. Aprazolam effectively aborts panic attacks when used parenterally as a single dose in the range of 0.25-3 mg. When ingested in pill form, effects are demonstrated after approximately 30 minutes. When medication is administered by the Gum Pad, it is absorbed directly into the systemic circulation, avoiding high first pass metabolism, a problem for benzodiazapines. A freeze dried preparation containing 1 mg of aprazolam is placed in the reservoir layer of the pad. The pad is inserted at the onset of heightened anxiety or a panic attack. Effects are noted within 2-10 minutes, with marked diminution of anxiety. Pad can then be removed and another pad applied if the anxiety recurs. After the pad is removed, antianxiety effects dissipate over the following 20 minutes. Concentration of aprazolam, frequency of use, and the duration of application to the buccal surface may vary within the recommended dosage. Other short acting benzodiazapines that could be applied in a similar manner to treat acute anxiety are brotizolam and triazolam.

Detailed Description Text (68):
3. The short acting, powerful anesthetic, midazolam, can also exert hypnotic and sedative effects when administered in lesser doses. Although midazolam is classified as a benzodiazapine, it differs from other benzodiazapines in that it is an acid salt that is soluble in water. It is usually administered parenterally. For preoperative sedation, 5 mg of midazolam is administered by intramuscular injection to adults. Transmucosal midazolam is used for preoperative sedation in children in doses of 0.2

to 0.75 mg/kg. Administration in a flavored syrup preparation to the sublingual mucosa is more readily accepted by children compared to rectal or nasal administration. Sublingual dosing produces higher plasma levels than nasal or rectal administration, with sedative and anxiolytic levels attained within 10 minutes. Table I, from Scott et al. (1998), is a representative plot of serum midazolam concentrations at various intervals following buccal administration. The Gum Pad can be used for preoperative sedation. For adult use, a solution containing 2.5 mg of midazolam with fruit flavoring is added to the absorbent second layer of the pad. The pad is then freeze-dried. One-half to one hour preoperatively, the pad is inserted in between the gum and buccal mucosa and left in place until the patient appears sufficiently relaxed. Initial effects are observed within minutes and peak effects are observed in 15 to 50 minutes, matching peak plasma concentrations. The pad can be left in place until the induction of anesthesia if desired. Another medication in this class is etomidate. It has already been applied transmucosally and would be a suitable candidate for use with the Gum Pad. Table II, from Streisand, Jaarsma et al (1998) portrays serum etomidate concentrations at various intervals following oral transmucosal application of 12.5, 25, 50, and 100 mg of etomidate.

Detailed Description Text (69):
4. Fentanyl is an opioid analgesic and sedative that reacts principally with the opioid receptors in the brain. It is frequently used postoperatively to alleviate pain and to increase drowsiness. Fentanyl citrate, 0.05 mg/ml, is the form administered parenterally. Fentanyl has been administered by adhesive dermal patch and transmucosally by use of a lozenge on a stick (Oralet). Transmucosal delivery of fentanyl is as efficacious as parenteral administration. A fentanyl dosage of 300-400 micrograms produces sedation and analgesia that is maintained for hours. Table III, from Macaluso et al. (1996), illustrates the effectiveness of oral transmucosal fentanyl on preoperative anxiety in a controlled experiment. Fentanyl transfers readily through the buccal mucosa and a therapeutic level is rapidly attained in 10-20 minutes. Table IV, from Streisand, Busch et al. (1998), shows the mean serum fentanyl concentration following oral trasmucosal application as a function of time and doseage. A solution containing 250 micrograms of fentanyl citrate is added to the absorbent second layer of the Gum Pad, which is then dried. The pad is applied between the gum and buccal mucosa and left in place. Fentanyl concentrations in the serum steadily increase and can be maintained at a fairly constant level for 8-72 hours if necessary.

Detailed Description Text (70):
5. Oxytocin is a model peptide used to stimulate uterine contractions to induce or maintain labor. It is administered by I.V. drip, by suppository, nasal spray, and more recently by buccal patch. It is destroyed by gastric enzymes when ingested. It is rapidly absorbed through the mucosa with peak levels attained in 5-10 minutes. Plasma half-life is brief and clinical response lasts 1-3 hours depending on route of administration. A solution containing 2.5 units of oxytocin is added to the absorbent second layer (14) and the pad is placed between gum and buccal mucosa. Onset of action is rapid (2-5 minutes) and the pad may be left in place until the desired outcome is attained. Additional pads may be inserted as clinically indicated up to a maximum total dose of 10 units. The following categories of biologically active peptides and proteins cannot be administered by pill or capsule but can be absorbed transmucosally: appetite enhancers (NPY); appetite inhibitors (CCK); immune system enhancers (interferon, enkephalins, thymopoietin, TNF); cardiovascular (tissue plasminogen activator, bradykinin, angiotensin antagonists); and metabolic modulators (insulin, human growth hormone, gonadotrophins, buserelin, melatonin, calcitonin, vasopressins, LHRH, growth factors). GLP-1 is a glucagon-like peptide used to modulate plasma insulin levels. Table V (three parts), from Gutiak et al., details changes in plasma glucose, insulin, and glucagon levels after transmucosal delivery of GLP-1.

Detailed Description Text (71):
6. Dronabinol contains the most active ingredient found in marijuana, tetrahydrocannabinol (delta-9-THC). Dronabinol is used to relieve nausea and vomiting secondary to cancer chemotherapy and to stimulate appetite in cancer and AIDS patients. Appetite enhancing effects can persist for more than 24 hours. Dronabinol is insoluble in water and is formulated in sesame oil for oral administration. Doses of 2.5-5 mg and a total daily dose of 15-20 mg are considered safe. When dronabinol is ingested in pill form, it is almost completely absorbed from the gastrointestinal

tract but then largely destroyed due to extensive first-pass deactivation in the liver. Only 10-20% of the medication reaches the systemic circulation after oral administration. Activity is preserved when it is administered parenterally or transmucosally. Dronabinol is lipophilic with an affinity for the brain and adipose tissue. After oral ingestion, it is stored in adipose tissue and slowly released with a half-life of 30 hours. Medication effects commence in one-half to 2 hours with peak effects from 2-4 hours. Gum Pad administration is ideal for this medication because dronabinol is easily absorbed through the lipophilic oral mucosa and can enter the systemic circulation directly, thus avoiding first-pass degredation in the liver. A preparation containing 5 mg dronabinol is added to the absorbent second layer of the pad. The pad is then freeze-dried. The pad is inserted between the gum and buccal mucosa and left in place until the nausea subsides and appetite returns. Initial effects are observed within minutes and peak effects are observed in 30-60 minutes. Other antiemetic medications that could be used with the Gum Pad include compazine, benadryl, ondansetron, hydroxyzine, meclizine, and trimethobenzamide.

Detailed Description Text (72):
7. Propranolol is a beta-adrenergic receptor blocking agent used to treat cardiac arrhythmias. It is also used to abort stage fright. Propranolol is absorbed from the gastrointestinal tract in 15-25 minutes and peak levels are achieved in 1-11/2 hours. Propranolol is moderately short acting with a half life of 4 hours. Individuals vary in their response to proptanolol; some respond as well to 10 mg as others do to 60 mg. Because a rapid response is critical in treating arrhythmias but the problem is time limited, transmucosal propranolol is an ideal medication for use at home or before arriving at the emergency room. When the episode terminates, the pad is removed. Because of the variation in individual responses to beta blockers, pads of varying dosage are prepared. A solution containing either 5 mg, 10 mg, or 30 mg is added to the absorbent second layer of the pad. The pad is then freeze-dried. When the arrhythmia is noted, the pad is inserted between the gum and buccal mucosa and left in place until the arrhythmia converts to a regular rhythm. The pad is effective in 2-8 minutes with peak medication levels achieved in one hour. Pads can be kept at home by cardiac patients using monitoring devices. In addition to propranolol, beta blockers esmolol and metaprolol have a very short half life, making them suitable for the treatment of cardiac arrhythmias. These medications can be used with the Gum Pad. Verapamil, a calcium channel blocker, and adenosine, a purine nucleotide, are also used in the emergency treatment of arrhythmias and can be applied with the Gum Pad. Streptokinase, a bacterial protein and urokinase, an enzyme, are used as soon as possible after a heart attack to dissolve the clot. These agents could be delivered transmucosally using the Gum Pad.

CLAIMS:

1. A gum pad for use in the mouth of a person comprising:

(a) a nonporous first layer;

(b) a second layer adjacent said nonporous first layer having a medication capable of being liquified by saliva retained in said second layer;

(c) a semi-permeable third layer covering said second layer and sealed to said first layer to form a pocket enclosing said second layer,

(d) wherein said semi-permeable third layer is permeable to saliva such that the saliva can penetrate therethrough to liquify the medication retained in said second layer and transport it by liquid diffusion back through said semi-permeable third layer; and

wherein said first layer is made of a stable and flexible material and has an outer surface adapted to be installed in place on the gum in the mouth of the person using the gum pad, with said third layer facing outwardly toward oppositely facing mucosal tissues in the mouth.

2. A gum pad according to claim 1, wherein the outer surface of said first layer has an adhesive compound applied to it for adhering to the gum when installed for use.

3. A gum pad according to claim 1, wherein the medication retained in said second layer is mixed or compounded with a material selected from the group consisting of: water soluble exipient matrix; water soluble hydrogel matrix; and free flowing lipophilic particles.

4. A gum pad according to claim 1, wherein said third layer is a semi-permeable membrane made of a type of material selected from the group consisting of: thin polymer film containing pores; nonwoven fibers bonded together having inter-fiber pores; and foam layer with open cells as pores.

5. A gum pad according to claim 4, wherein said semi-permeable third layer has a porosity of about 30 to 70 volume %, and a fluid permeability greater than about 2.times.10.sup.-4 cm mil/atm hr, so as to be readily permeable to saliva and saliva transport of medication dissolved therein.

6. A gum pad according to claim 1, wherein the medication retained in said second layer is selected from the group consisting of: uncharged molecules; molecular complexes; pharmacologically acceptable salts, acids, amines or organic cations; derivatives of esters, amides, or ethers; biologically active polypeptides or proteins; and nutritional supplements.

7. A gum pad according to claim 1, wherein the medication retained in said second layer is selected from the group consisting of: anticonvulsants; anxiolytics; anesthetics; analgesics; peptides; antiemetics; and beta-adrenergic blockers.

8. A gum pad according to claim 1, used for topical treatment of tissue in the mouth of a person using the gum pad, wherein said first layer is made of a stable and flexible material and has an outer surface adapted to be installed in place on a supporting tissue area and said third layer faces outwardly toward the tissues to be treated topically in the mouth.

9. A gum pad according to claim 1, wherein gum pad has an elongated, generally tubular shape with bulb shaped ends, said first layer has a flat outer surface, and said third layer has a curved outer surface, such that the gum pad can be installed between the buccal mucosa and the gums of the teeth at a front part of the upper and/or lower jaw of the mouth extending to posterior areas of the jaw.

10. A medication delivery method of delivering medication into the human circulatory system from within the mouth of a person, said method comprising the steps of:

(a) providing a pad having a nonporous first layer, a second layer for retaining a medication therein, and a semi-permeable third layer covering the second layer and sealed to said first layer so as to form a sealed pocket enclosing said second layer;

(b) impregnating said second layer with medication to be delivered into the human circulatory system; and

(c) placing said pad on a supporting part within the mouth of the person with said semi-permeable third layer facing outwardly toward mucosal tissue in the mouth so as to permit saliva within the mouth to Penetrate into said semi-permeable third layer and liquify the medication in said second layer and transport it by diffusion through said semi-permeable third layer for absorption into the mucosal tissue,

wherein the medication retained in said second layer is selected from the group consisting of: anticonvulsants; anxiolytics; anesthetics; analgesics; peptides; antiemetics; and beta-adrenergic blockers.

18. A method of treating human systemic disease or disorder by delivery of medication into the human circulatory system through mucosal tissue within the mouth of a person, comprising the steps of:

(a) providing a pad having a medication soluble by saliva retained therein with a semi-permeable outer layer covering the medication retained in the pad, said semi-permeable outer layer facing outwardly toward mucosal tissue within the mouth of the person;

(b) placing said pad on a supporting part within the mouth of the person with said semi-permeable third layer facing outwardly toward mucosal tissue in the mouth so as to permit saliva within the mouth to penetrate into said semi-permeable third layer and liquify the medication in said second layer; and

(c) permitting saliva within the mouth to penetrate into the pad through said semi-permeable outer layer to liquify the medication retained therein; and

(d) transporting the medication dissolved in the saliva by diffusion through said semi-permeable outer layer for absorption into the mucosal tissue within the mouth of the person where it can enter into the human circulatory system.

19. A gum pad according to claim 1, wherein chitosan is applied as an adhesive on the external surface of the first layer of the gum pad.

20. A gum pad according to claim 1, wherein the first layer is composed of a naturally self-adherent hydrophilic polymeric resin that adheres to the mucosa.

21. A gum pad according to claim 1, wherein the medication is mixed with a material selected from the group comprising: free flowing liposomes; liposome-protein conjugates; and proliposomes.

22. A gum pad according to claim 1, wherein the medication is in a form selected from the group consisting of: a soluble powder adhering to a fibrous web; liquid sprayed on a fibrous web; and emulsion coated on the fibrous web.

23. A gum pad according to claim 1, wherein the medication is mixed with an exipient matrix made from a material selected from the group consisting of: cellulose product; polysaccharides; and conventional matrix material.

24. A gum pad according to claim 1, wherein the medication is mixed with a hydrogel matrix made from a material selected from the group consisting of: cellulose derivatives; polymers and co-polymers; gums, including alginate gum; and polytetrafluoroethylene web.

25. A gum pad according to claim 1, wherein the medication is mixed with an additive material selected from the group consisting of: sweeteners; flavoring agents; buffers; surfactants; enzyme inhibitors; co-solvents; and permeants.

26. A gum pad according to claim 1, wherein the medication is provided in a concentration sufficient to cause an osmotic gradient across the semi-permeable third layer when diluted with saliva.

27. A gum pad according to claim 1, wherein the medication is mixed with a hydrogel matrix and contains material selected from the group consisting of: enzymes; antibodies; proteins; and peptides.

36. A gum pad according to claim 1, wherein the semi-permeable third layer is a membrane formed from a material selected from the group consisting of: cellulose; cellulose derivatives; gums; semi-permeable polymers; and high flux membrane material.

37. A gum pad according to claim 1, wherein the medication is mixed with a matrix in the second layer, and the second layer is enclosed by laminating the edges of the first layer and a semi-permeable membrane third layers.

38. A gum pad according to claim 1, wherein the medication contains a freeze dried material, and the gum pad is enclosed in a sealed, waterproof envelope.

39. A human disease treatment method according to claim 18, wherein the gum pad is used for a treatment selected from the group consisting of: preventing gum deterioration; treating periodontal disease; preventing heart attacks and strokes; regulating cardiovascular function; treating bacterial or viral infection; boosting immune response; suppressing appetite; improving digestion; relieving pain; and

moderating metabolic and organic conditions.

40. A human disease treatment method according to claim 18, wherein upon the medication in the second layer absorbing saliva and flowing out through the third layer of the gum pad, the medication is absorbed by the mucosa, enters the capillaries and is transported through circulatory system.

41. A human disease treatment method according to claim 18, wherein two or more gum pads are applied simultaneously or sequentially to enable continuous medication delivery.

43. A human disease treatment method according to claim 18, wherein the gum pad is removable by the patient if any adverse effects are noted.

44. A human disease treatment method according to claim 18, wherein the gum pad is used with pre-operative patients, nauseated patients, patients who are non-compliant, or patients who fear needles.

45. A human disease treatment method according to claim 18, wherein the gum pad is used to deliver medication selected from the group consisting of: vitamins; herbs; plant extracts; and other nutritional products.

46. A human disease treatment method according to claim 18, wherein the gum pad is used to deliver water-insoluble medications which, when released systemically, is converted by metabolic processes to a biologically active form.

47. A human disease treatment method according to claim 18, wherein the gum pad is used to deliver a fat soluble medication selected from the group consisting of: liposomes; liposome-protein conjugates; and proliposomes.

49. A human disease treatment method according to claim 18, wherein the gum pad can be readily removed from the patient for rapid cessation of drug delivery if toxicity occurs.

50. A human disease treatment method according to claim 18, wherein the gum pad can be readily adjusted for rapid correction when patients are under or over-medicated.